LEAD ARSENATE PESTICIDES in SOIL

Information for home owners, land developers, and other members of the public

BACKGROUND

A wide variety of pesticides were used in Wisconsin over the past 100 years. One, a lead arsenate based pesticide, was used extensively to control agricultural pests in fruit orchards until the late 1950s.

Direct pesticide exposure occurred with workers who mixed or applied the chemicals in the orchards. Indirect exposure can occur with the pesticide residues found in the soil today.

The pesticide residues bind tightly to the surface soil layer, where they have remained for decades. As a result, the residues may pose a human health risk when the land changes from agriculture to other uses. For example, lead arsenate contaminated soil can be hazardous if children continually play in it.

Both lead and arsenic can be toxic at high concentrations in soils. These metals can also be found naturally occurring in certain soils throughout Wisconsin. The naturally occurring soil levels of these metals are not considered toxic. However, in existing and former orchards, lead arsenate pesticides have caused soil levels to become a health concern.

Historically, apple orchards required more pesticide applications than cherry orchards. Therefore, higher amounts of lead and arsenic are found in former apple orchards. The longer a property was an orchard, the higher the soil pesticide concentration.

HOW CAN I BE EXPOSED?

Exposure to lead arsenate pesticides in former orchard soils involves contact with the bare soils.

Some common activities that may increase exposure are:

Gardening or digging in the soil,
Children playing in contaminated soil (particularly if not washing after play),
Eating without first washing hands and face after digging in soils, and
Eating unwashed vegetables grown in the soils.

Under some conditions the pesticide use can contaminate groundwater. People living near orchard areas should test their private well water for lead. Arsenic from pesticide use is less likely to impact groundwater.

HEALTH CONCERNS

Arsenic: Long-term (over many years) arsenic exposure can lead to several types of cancer. Exposure to arsenic in soil poses a low health risk, however unnecessary exposure should be avoided.

Lead: Preventing lead exposure in infants and young children is important because lead can affect their developing brain and nervous system. High levels of lead can adversely affect the nervous system and kidneys of adults and children.

The levels of lead found in former orchard soils are usually below levels of health concern for residential areas. However, other sources of lead exposure (e.g. lead paint) may increase the negative health effects of lead.

PESTICIDE MIXING & LOADING AREAS

In many orchards there was an area used to mix the lead arsenate pesticides with water and loaded into sprayers. The soil levels of both lead and arsenic are generally much higher in these areas and can pose a significant health threat if not properly addressed. These mix/load sites typically will have a water source such as an old well. Contact the regional Department of Natural Resources (DNR) office for help with these sites.

GENERAL RECOMMENDATIONS

Sampling orchard soils

Sampling the soil can help identify if arsenic and lead is on your property:

Soil sampling should be conducted when a agricultural property changes to other land use (e.g. farmland changed to a residential development or park).
For properties already redeveloped, sampling can be focused in areas where contact with the soils is expected (e.g. children's play areas or gardens).

Homeowners interested in testing their soil should call the DNR or local conservation agency.

Limit Access to Contaminated Soils

Lead and arsenic levels vary in Wisconsin soils. Non-orchard area arsenic levels are normally below 5 parts per million (ppm); normal lead levels are below 50 ppm. If arsenic and lead levels are higher than normal, some basic steps can help minimize soil contact:

Keep good grass and vegetative cover on lawns; this acts as a natural soil barrier.
Cover any exposed or bare soil with grass, vegetation or other surface material (e.g. gravel or pavement).
Bring in clean sand for sandboxes; and soil from a non-orchard area for gardens.
When developing new residential areas in former orchards, plan landscaping so the top six inches of original soil is covered beneath cleaner soils.

Minimize Exposure

When contact with soils cannot be avoided, some basic habits will significantly reduce exposures and related health concerns:

Wash hands and face after touching soil and before meals and snacks.
Wash fruits and vegetables from your garden before eating. Uptake of arsenic and lead by plants is less of a concern than eating produce with soil stuck to it.
Keep toys and pacifiers clean when used outside.
Avoid tracking soil into the home and clean up right away if it happens.

The risk from high arsenic and lead levels can become significant when the exposure occurs repeatedly over several years. Occasional exposure is not much of a health risk.

FOR MORE INFORMATION

- For health related questions, contact the Division of Public Health, BEH, 1 West Wilson St, Rm. 150, Madison, WI 53701-2659, (608) 266-1120.

- For internet resources about lead and arsenic or to contact the DNR, visit: http://www.dhfs.state.wi.us/eh

Prepared by the
Wisconsin Department of Health and Family Services
Division of Public Health with funds from the
Agency for Toxic Substances and Disease Registry,
Public Health Service,
U.S. Department of Health and Human Services.

(PPH 45007 12/2000)